

ISD Software Process Overview

January 20, 2006

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Software Process Improvement (SPI) Project

- **Purpose and Objectives**
- **ISD Process Overview**
- **Finding Assets in the Process Asset Library (PAL)**
 - **<http://software.gsfc.nasa.gov/process.cfm>**

Purpose and Objectives

- **Purpose: Provide a walkthrough of top-priority ISD Mission Software process assets**
- **Objective: Help you understand:**
 - What's in a process description
 - How the ISD process library is organized
 - What tasks are required for selected processes
 - Where to find support assets for each process addressed
 - Where to find assets in the Process Asset Library (PAL)

Definitions for This Presentation

- **Top Priority Processes** – Refers to those processes that focus on the monitoring and controlling aspects of software project management
- **Mission Software** – Refers to software directly associated with the operational support of flight projects, including network communications, planning and scheduling, flight system (spacecraft and instrument), flight dynamics, ground mission and science command and control, and science data capture software
- **Project** – Refers to Software projects for the development or maintenance of mission support software
- **Data Management** – Refers to the collection, control, and handling of all process, management, and project data
- **Project Manager** – Refers to those who perform software project management functions, for example Development Team Lead, Product Development Lead, or Software Manager

Process Description Content

- Purpose
- Scope
- Context
- Roles and Responsibilities
- Inputs
- Entry Scenarios
- Entry Criteria
- Exit Criteria
- Outputs
- *Major Task (list)*
- *Major Task Description*
- Measures
- Tools
- Training
- References
- QMS Records

ISD Process Categories

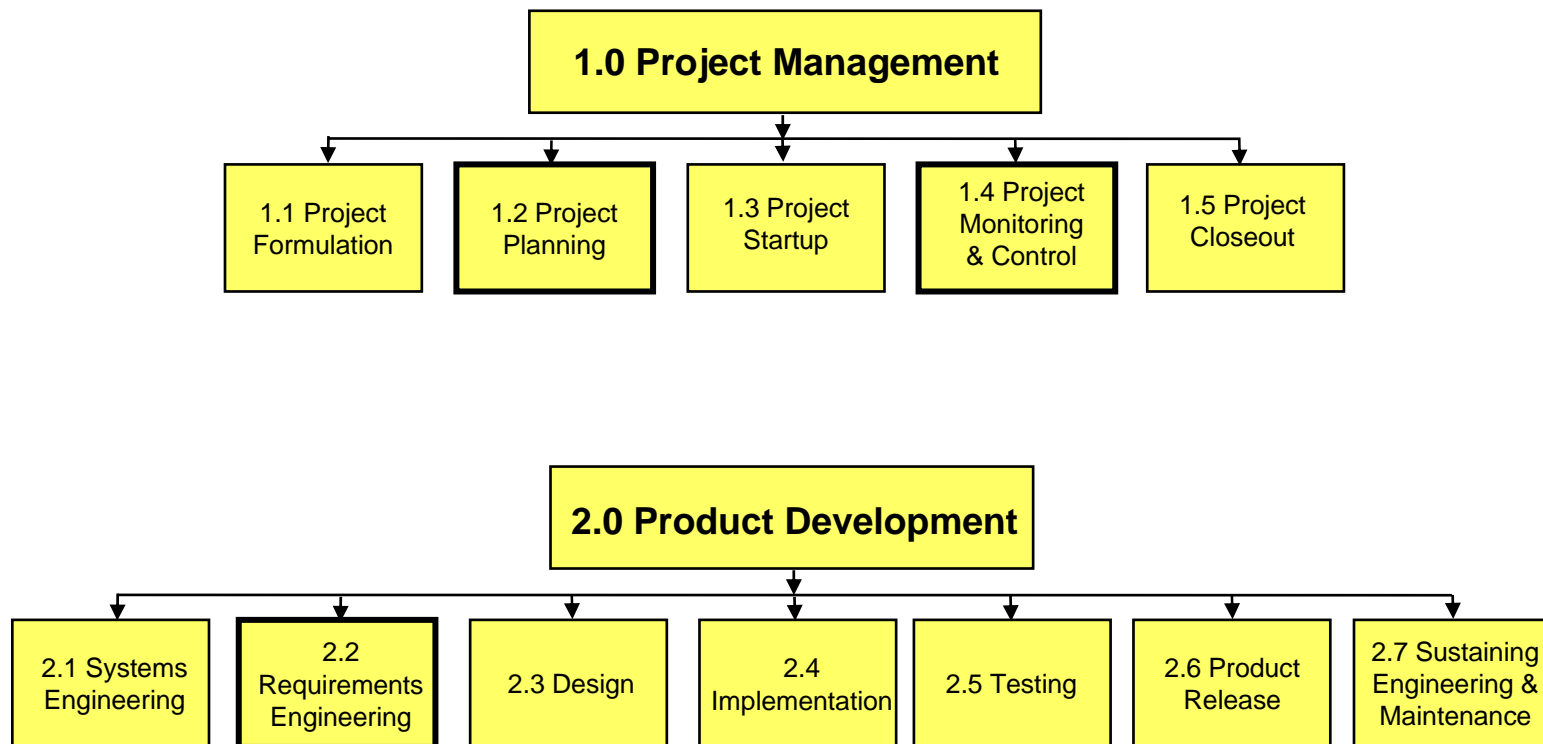
1.0 Project Management

2.0 Product Development

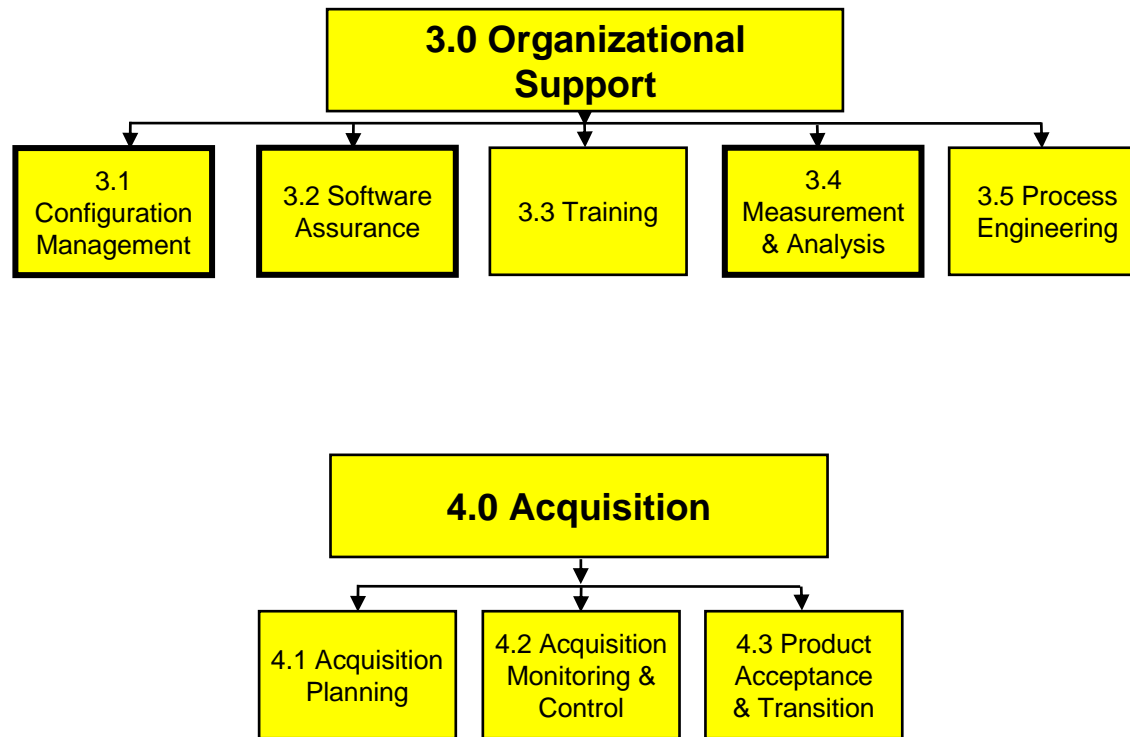
3.0 Organizational Support

4.0 Acquisition

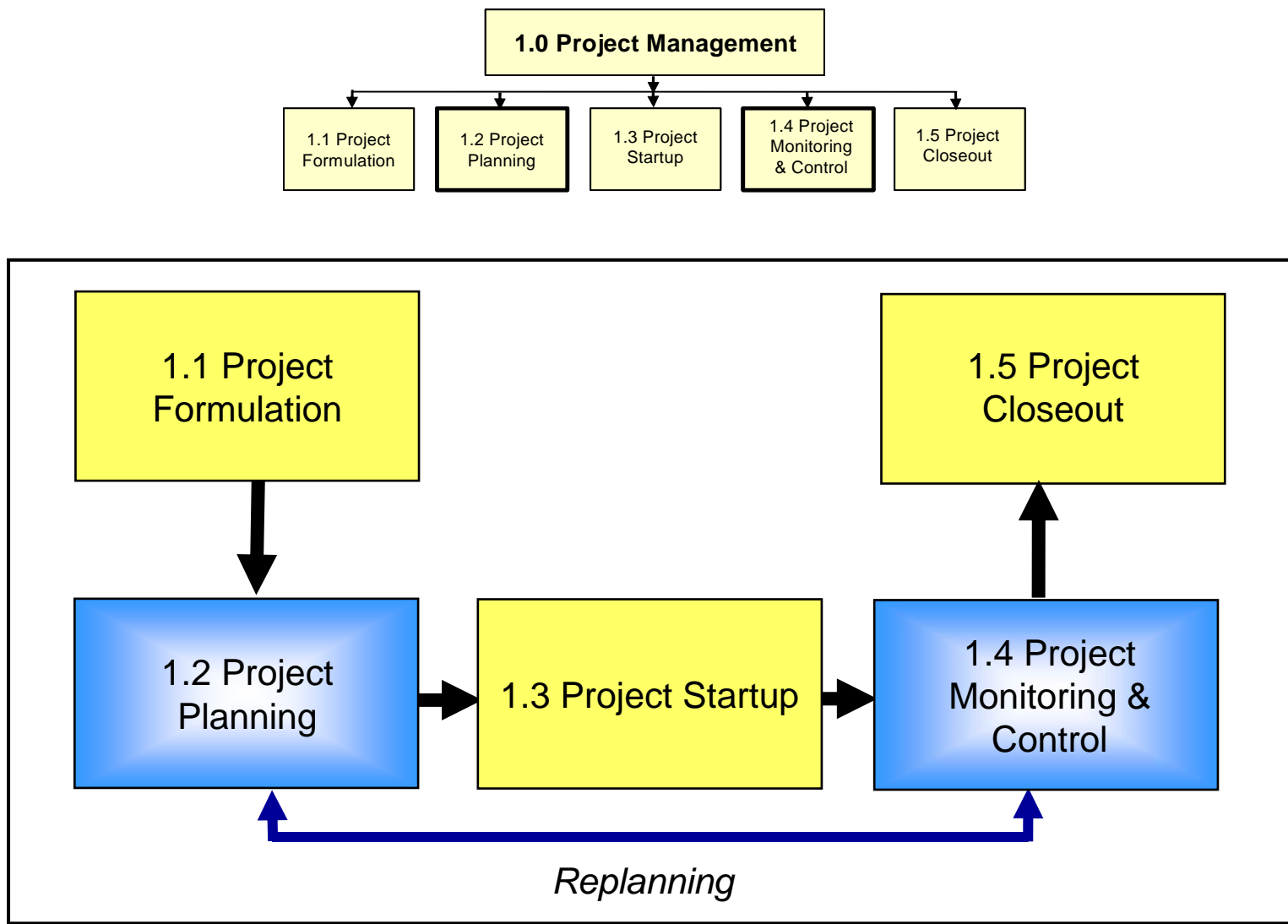
Process Categories, 1 of 2



Process Categories, 2 of 2

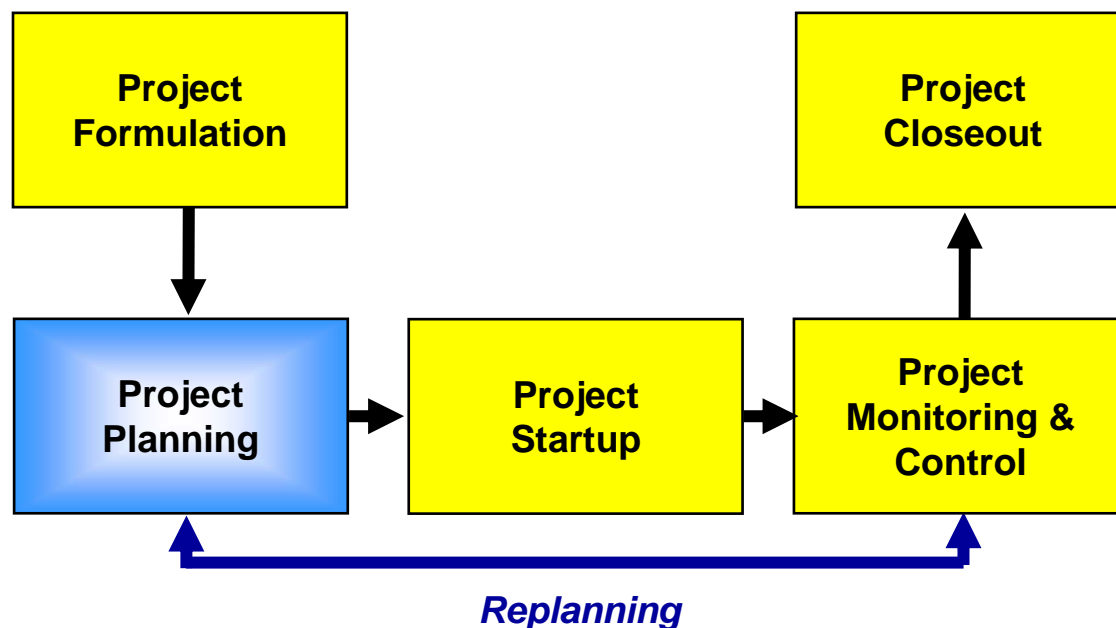


Project Management Process Flow



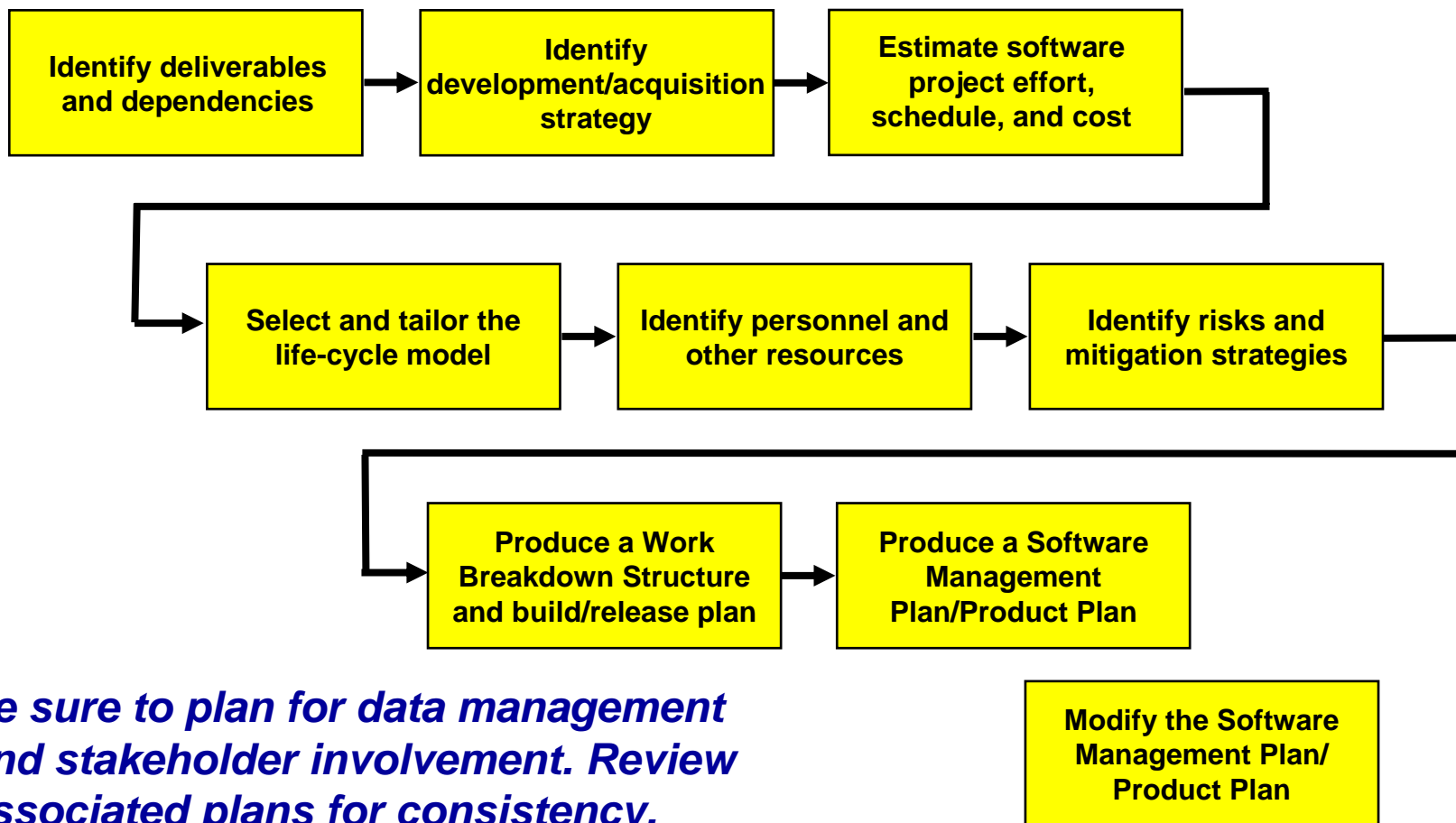
Project Planning Process

Helps you formulate your approach for managing and conducting your software development or maintenance effort.



Project Planning Tasks

Tasks performed sequentially, iteratively, or in parallel *



**** Be sure to plan for data management and stakeholder involvement. Review associated plans for consistency.***

Project Planning Tasks

■ Project Planning Tasks

- Identify deliverables and dependencies
- Identify development/acquisition strategy
- Estimate software project effort, schedule, and cost
- Select and tailor the life-cycle model
- Identify personnel and other resources

■ Project Planning Tasks (contd.)

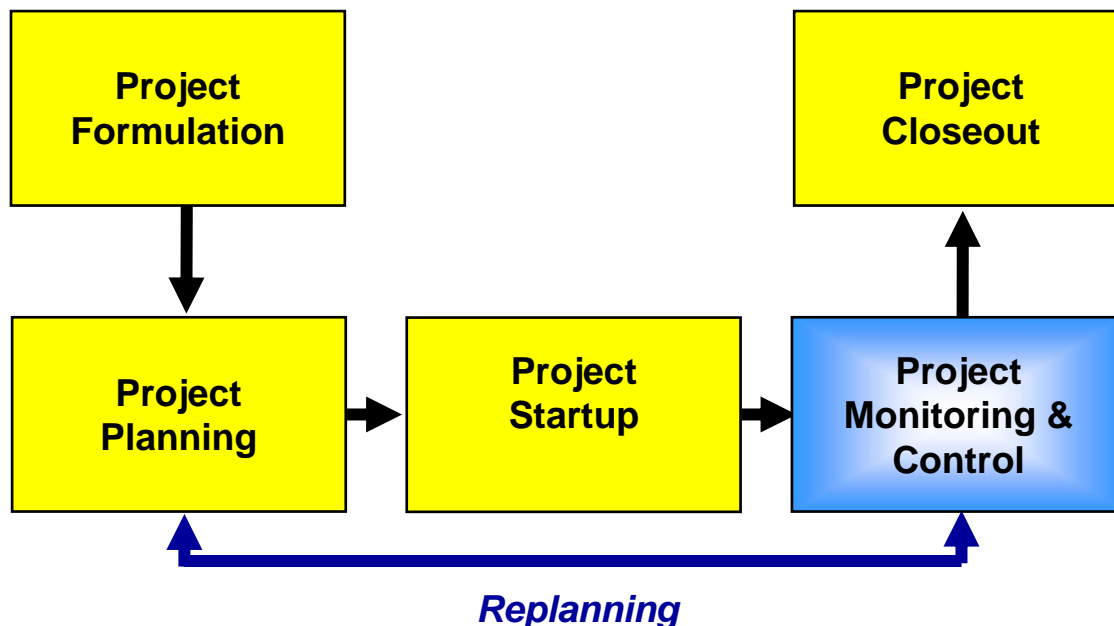
- Identify risks and mitigation strategies
- Produce a Work Breakdown Structure (WBS) and build/release plan
- Produce a Software Management Plan/Product Plan
- Modify the Software Management Plan/Product Plan

Project Planning – Related Assets

- **Policies**
 - ISD Software Policies (1.0.0.1)
- **Processes and Sub-processes**
 - ISD Project Planning Process (1.2)
 - Estimating the Software Process (1.2.1)
 - ISD Software Risk Identification (1.2.3)
- **Standards, Procedures, Guidelines, Templates, and Checklists**
 - Wide Band Delphi Procedure (1.2.1.2)
 - ISD Guidelines for the WBS (1.2.4.1)
 - Estimating the Software Project (1.2.1)
 - Guidance on Data Management and Process Configuration Management (3.1.1.2)
 - ISD Software Management Plan/Product Plan templates (1.2.6.1 and 1.2.6.3)
 - FSW In-house Life-Cycle (1.2.2.1.1)
 - FSW Product Plan Template (1.2.6.1.1)
- **Tools**
 - Point Counting Spreadsheets (1.4.2.1)

Project Monitoring and Control Process

Shows you how to assess your project's progress so you can take corrective actions when performance deviates from your plan.



Project Monitoring and Control Tasks

Tasks performed continuously*

Monitor software
project activities
and resources

Monitor work
products and
project data

Monitor software
acquisition

Monitor
commitments

Tasks performed as needed

Manage corrective
actions

Generate
management
reports and reviews

Conduct milestone
reviews

Document lessons
learned

**** Monitor data management, stakeholder involvement, and risk elements of the software project as you go.***

Project Monitoring and Control – Related Assets

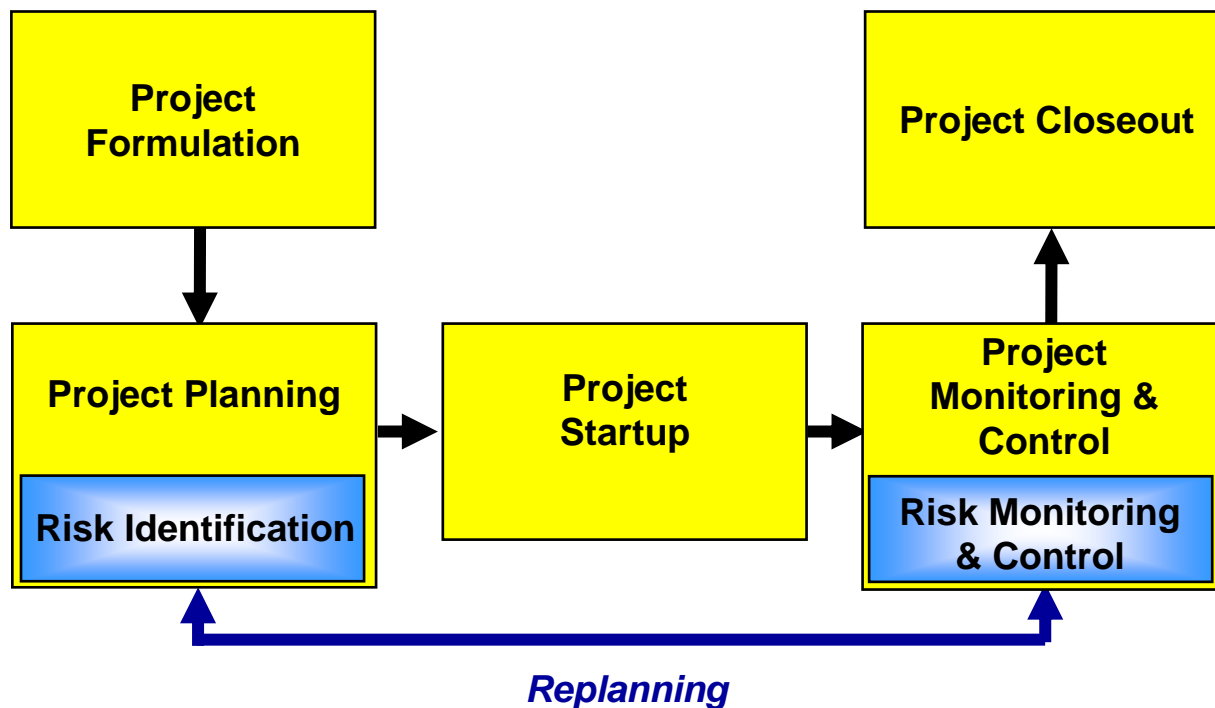
- **Policies**
 - ISD Software Policies (1.0.0.1)
- **Processes and Sub-processes**
 - ISD Project Monitoring and Control (1.4)
 - Risk Monitoring and Control (1.4.4)
- **Standards, Procedures, Guidelines, Templates, and Checklists**
 - Action Item Tracking Guideline (1.4.3.5)
 - Contents of the Software Requirements Review (2.2.1.6)
 - Software Contents of the Mission-Level Preliminary Design Review (2.3.1.5)
 - Contents of the Software Preliminary Design Review (2.3.1.6)
 - Software Contents of the Mission-Level Critical Design Review (2.3.2.4)
 - Contents of the Software Critical Design Review (2.3.2.5)
 - ISD Branch Status Review Template (1.4.3.4)
 - FSW Status Reporting Templates (1.4.3.2.1, 1.4.3.2.2, 1.4.3.2.3)
 - FSW PDR Standard (2.3.1.6.1)
 - FSW Preliminary Design Review Standard (2.3.1.6.1)
 - FSW Critical Design Review Standard (2.3.2.4.1)
- **Tools**
 - Point Counting Spreadsheets (1.4.2.1)

Project Monitoring and Control – Other Related Assets

- **FSB Measurement, Analysis and Reporting Standard**
- **SDO Metrics Collection and Storage Procedures**
- **JWST Metrics Collection and Storage Procedures**

Risk Management Process

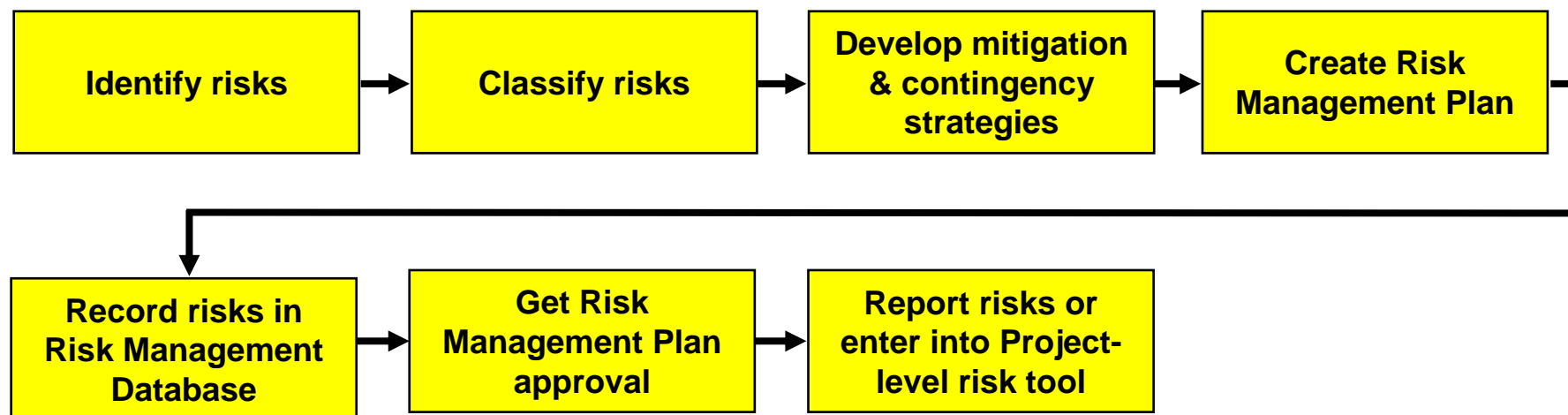
Helps you minimize the impact of risks on cost, schedule, and quality of your software project products.



Risk Identification Tasks

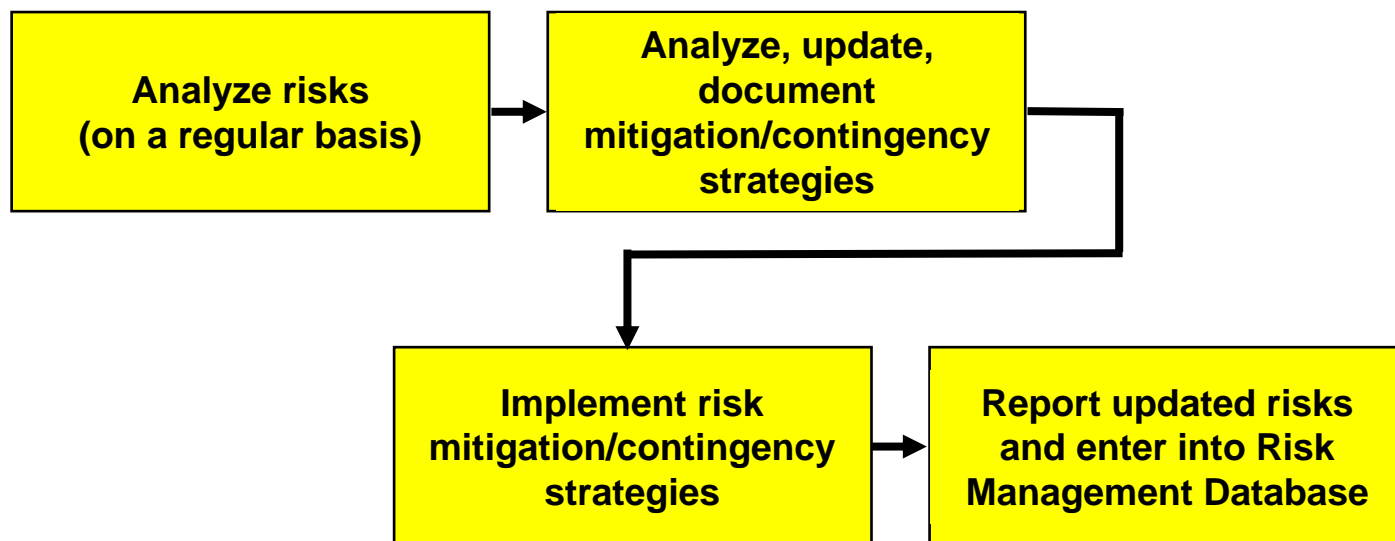
Tasks performed sequentially and iteratively*

**As you begin risk identification, establish a risk strategy and identify risk sources and categories.*



Risk Monitoring & Control Tasks

Tasks performed sequentially and iteratively



■ Policies

- ISD Software Policies (1.0.0.1)
- FSW Risk Management Policy (1.2.3.1.0)

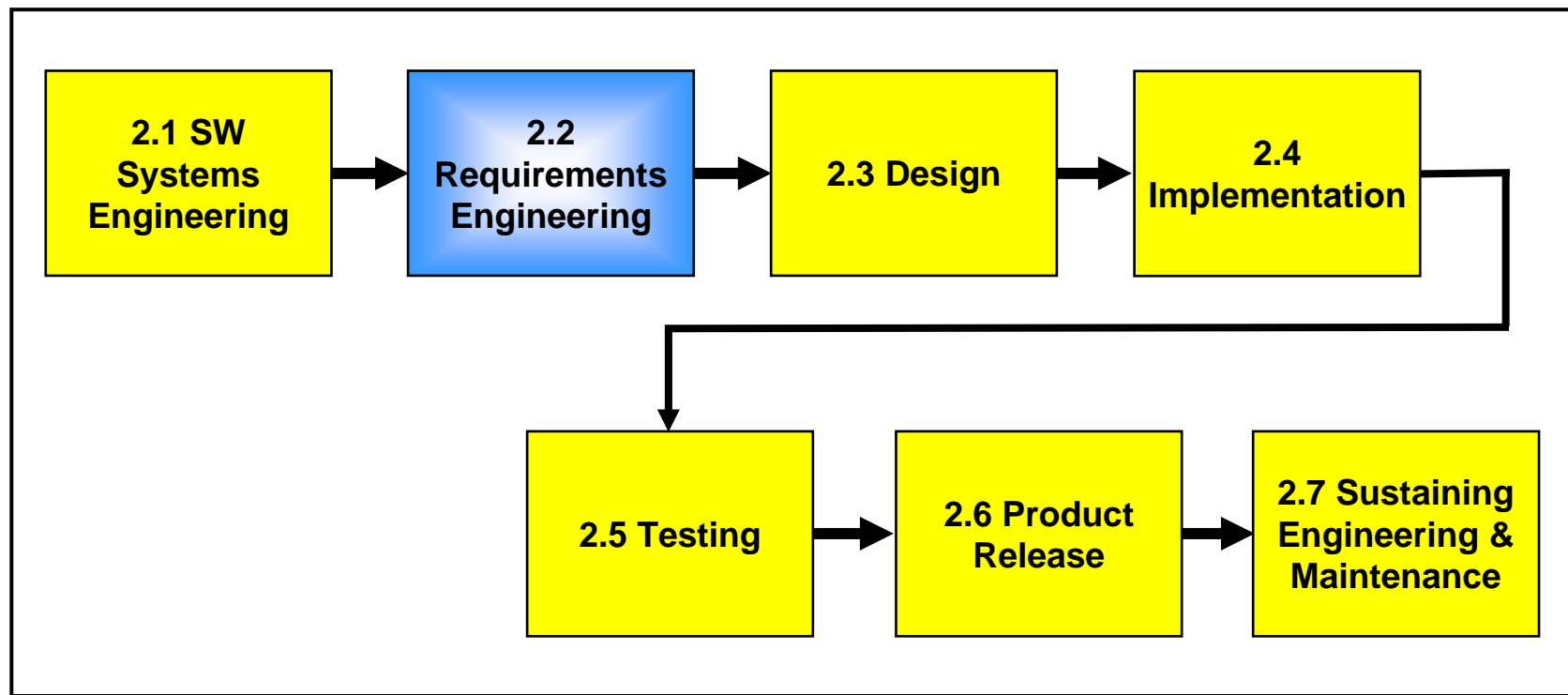
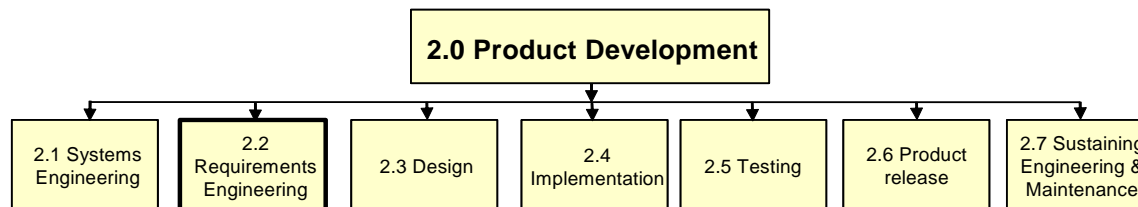
■ Processes and Sub-processes

- ISD Software Risk Identification (1.2.3)
- ISD Software Risk Monitoring and Control (1.4.4)

■ Tools

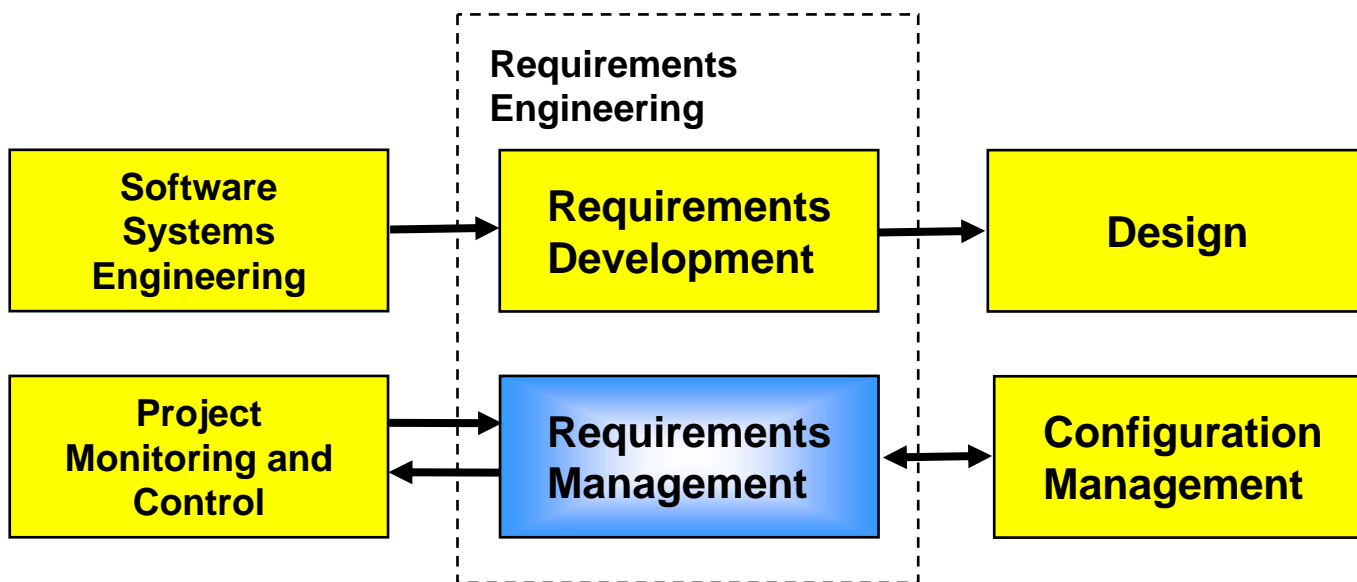
- FSB Risk Management Tool (1.2.3.3.1)

Product Development Process Flow



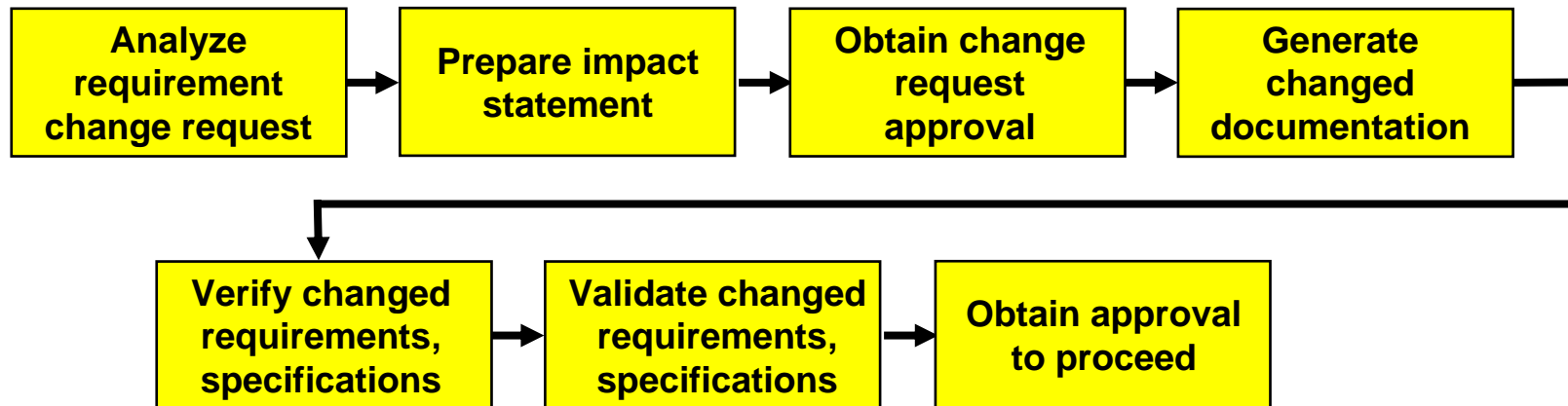
Requirements Management Process

Keeps software project requirements change under control and lets you avoid unintended scope growth.



Requirements Management Tasks

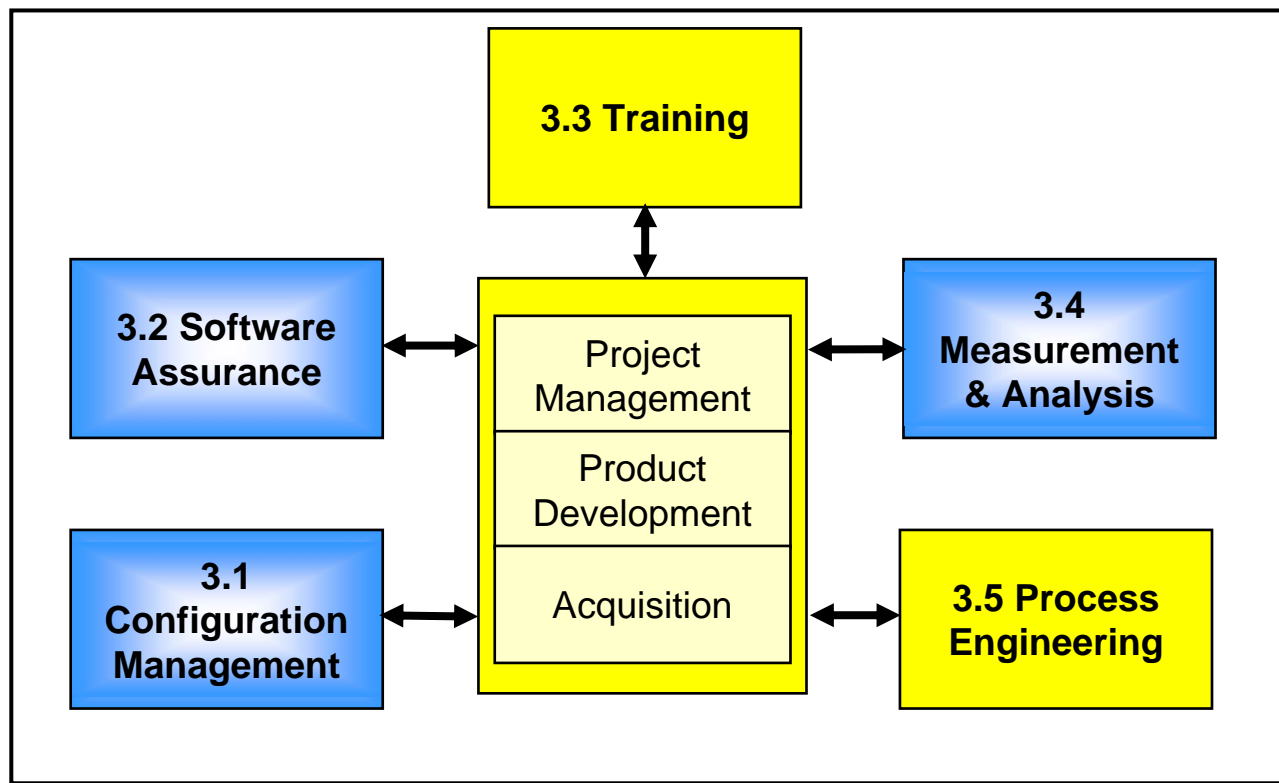
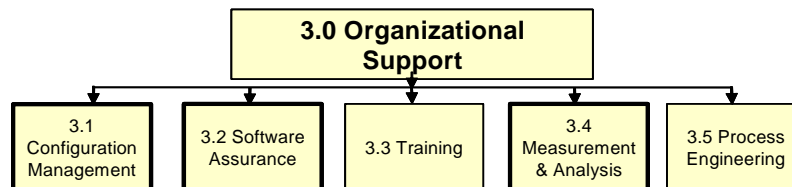
Tasks performed sequentially and iteratively



Requirements Management – Related Assets

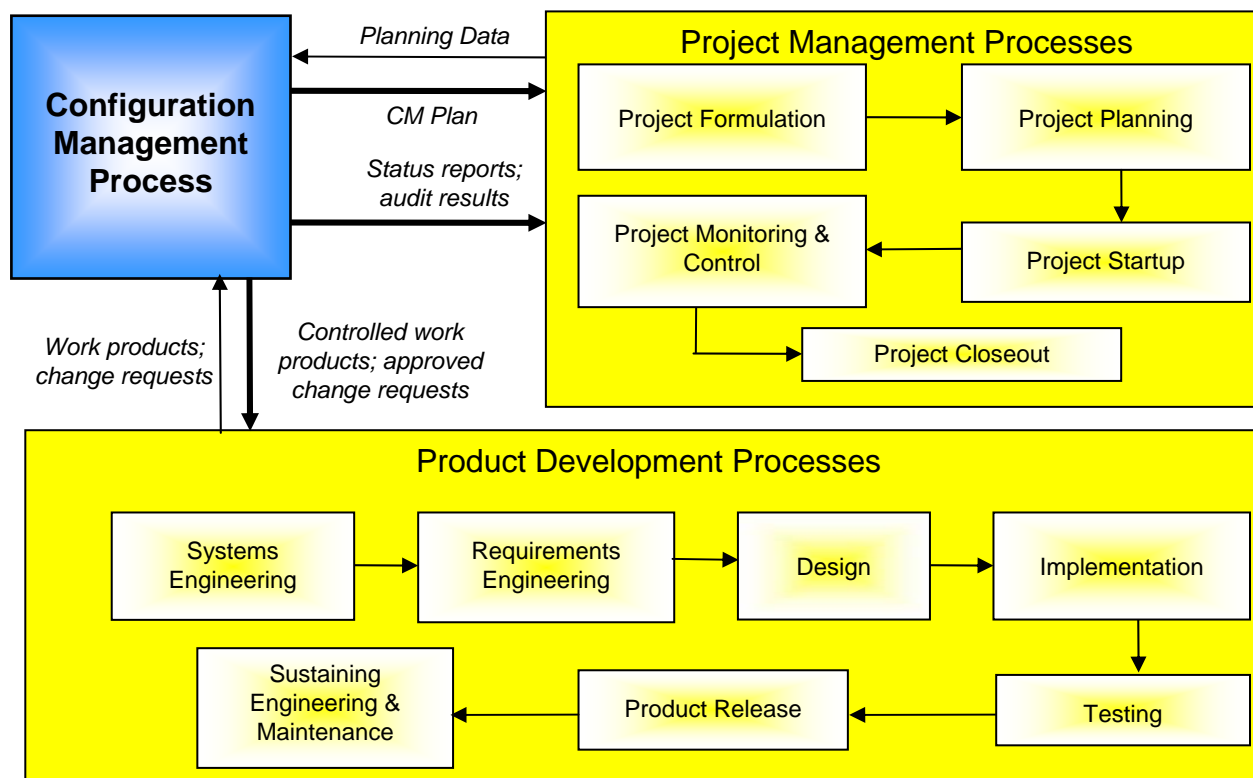
- **Policies**
 - ISD Software Policies (1.0.0.1)
- **Processes and Sub-processes**
 - ISD Requirements Management Process (2.2.2)
- **Standards, Procedures, Guidelines, Templates, and Checklists**
 - Contents of the Software Requirements Review (2.2.1.6)
 - FSW Requirements Review Standard (2.2.1.6.1)
 - FSW Requirements Document Template (2.2.1.2.1)
- **Tools**
 - Rational RequisitePro – FSW standard requirements management aid (<http://www-306.ibm.com/software/awdtools/reqpro/>)
 - DOORs - Requirements tracing aid (<http://www.telelogic.com/products/doorsers/doors/>)
 - SLATE - Requirements tracing aid (<http://www.sdrc.com/>)

Organizational Support Process Flow



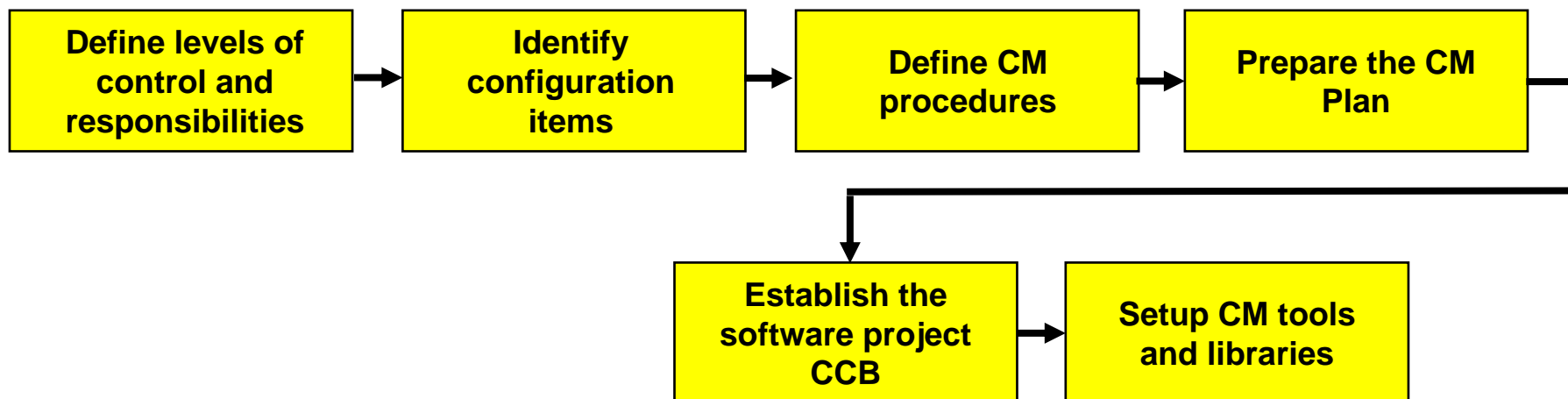
Configuration Management Process

Helps you maintain the integrity of work products.

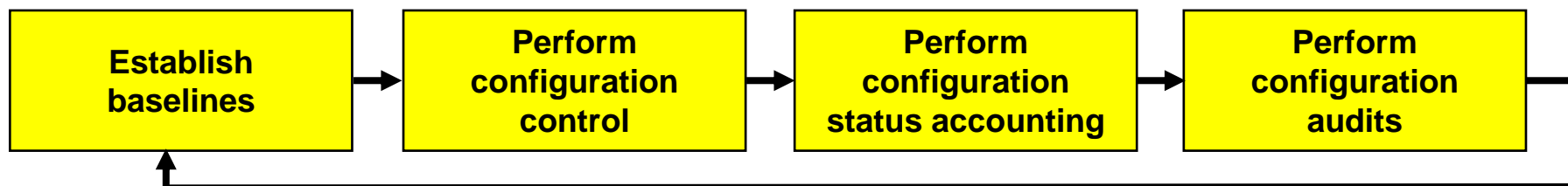


Configuration Management Tasks

Tasks performed sequentially during planning and startup



Tasks performed sequentially and iteratively



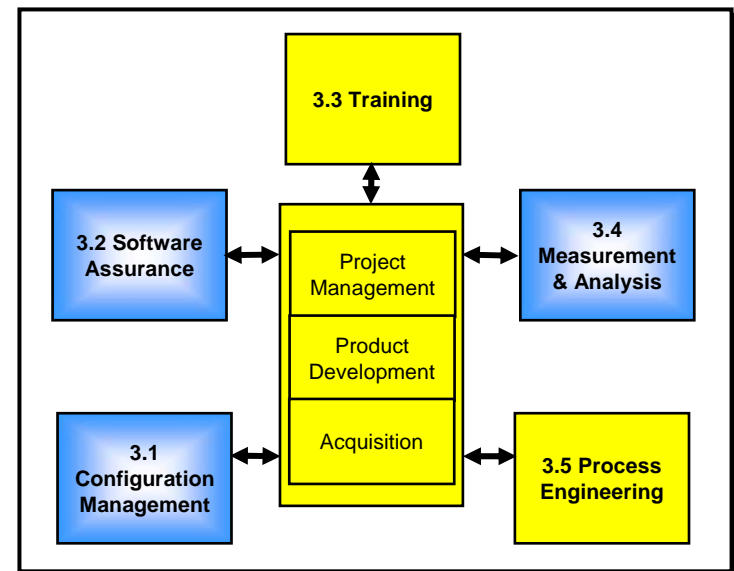
Configuration Management – Related Assets

- **Policies**
 - ISD Software Policies (1.0.0.1)
- **Processes and Sub-processes**
 - ISD Software Configuration Management (3.1)
 - FSB Standards CCB Process (3.5.3.1.1)
- **Standards, Procedures, Guidelines, Templates, and Checklists**
 - Functional Configuration Audit Checklist (3.1.1.3)
 - Physical Configuration Audit Checklist (3.1.1.4)
 - FSW Configuration Management Plan Template (3.1.1.1.1)

Software Assurance Process

Helps you ensure that software life cycle processes and products conform to requirements, standards, and procedures.

- Software Assurance begins during mission formulation
- The Office of Systems Safety and Mission Assurance (OSSMA), Code 300, nominally supports class B and class C software
- Software Quality (SQ) support is responsible for objective *evaluation of adherence* to all Process and Product Quality Assurance (PPQA) requirements
- Software Assurance is also supported by the Independent Verification and Validation Facility (IV&V)
- Software projects work in concert with these organizations

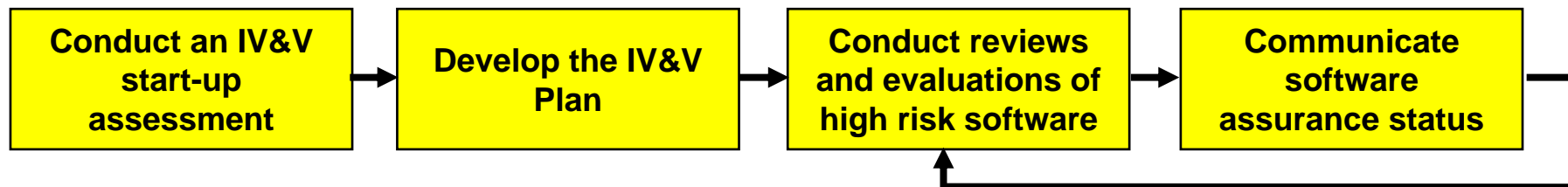


Software Quality Tasks – Code 300

Software Quality support – sequential and iterative

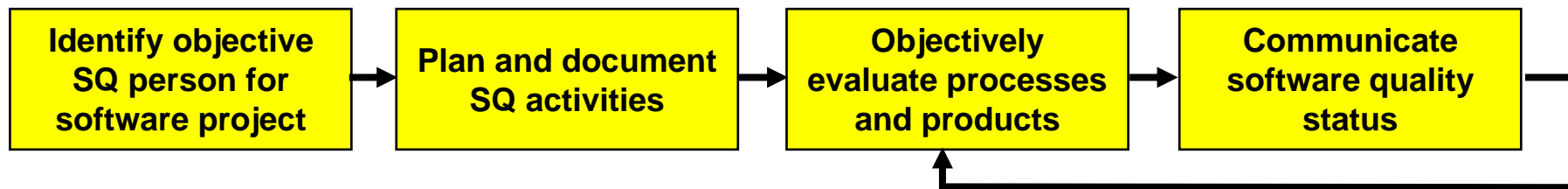


IV&V support (if funded) – sequential and iterative



If Not Supported By Code 300 ...

Tasks performed sequentially and iteratively

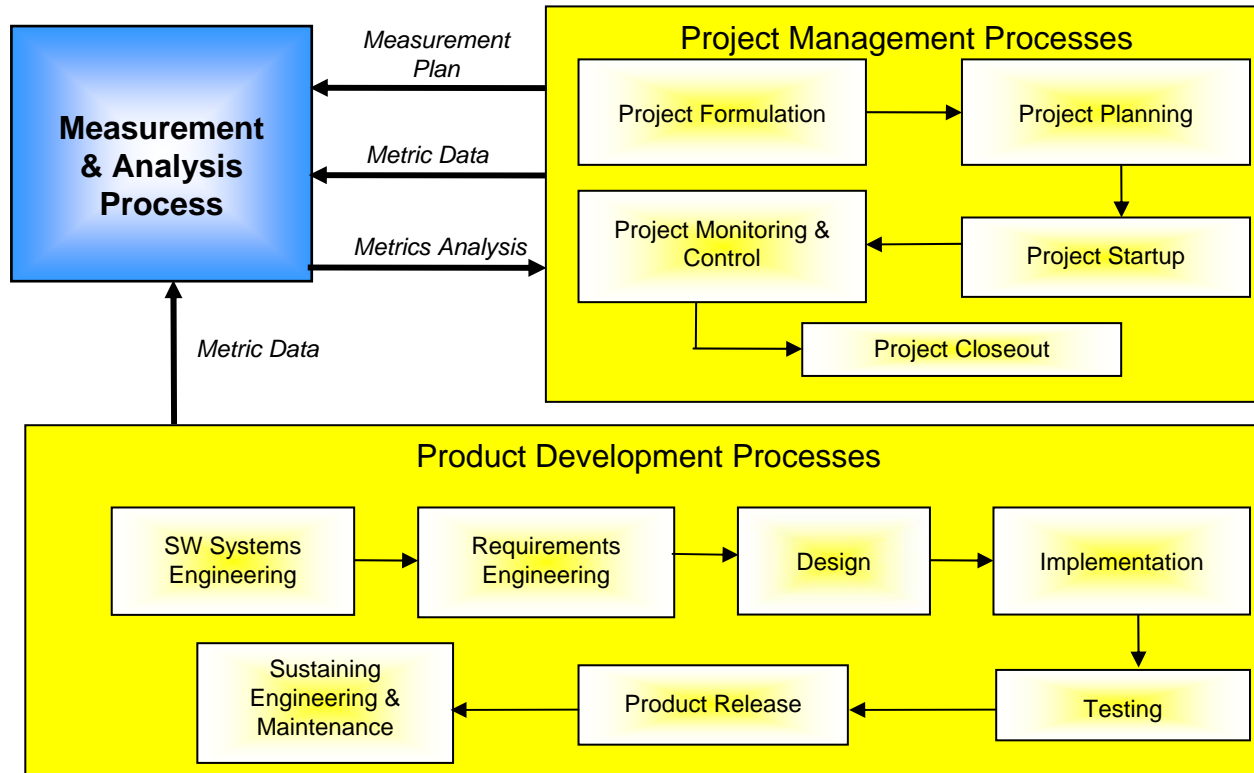


Software Assurance – Related Assets

- **Policies**
 - ISD Software Policies (1.0.0.1)
- **Processes and Sub-processes**
 - Procedure for Developing and Implementing Software Quality Programs: <http://sw-assurance.gsfc.nasa.gov/disciplines/quality/index.php>
- **Standards, Procedures, Guidelines, Templates, and Checklists**
 - Software Quality Assurance Plan template: <http://sw-assurance.gsfc.nasa.gov/disciplines/quality/index.php>
 - ISD Software Assurance Planning Guidelines (3.2.1.1)
- **Code 300 Assets:** <http://sw-assurance.gsfc.nasa.gov/disciplines/quality/index.php>

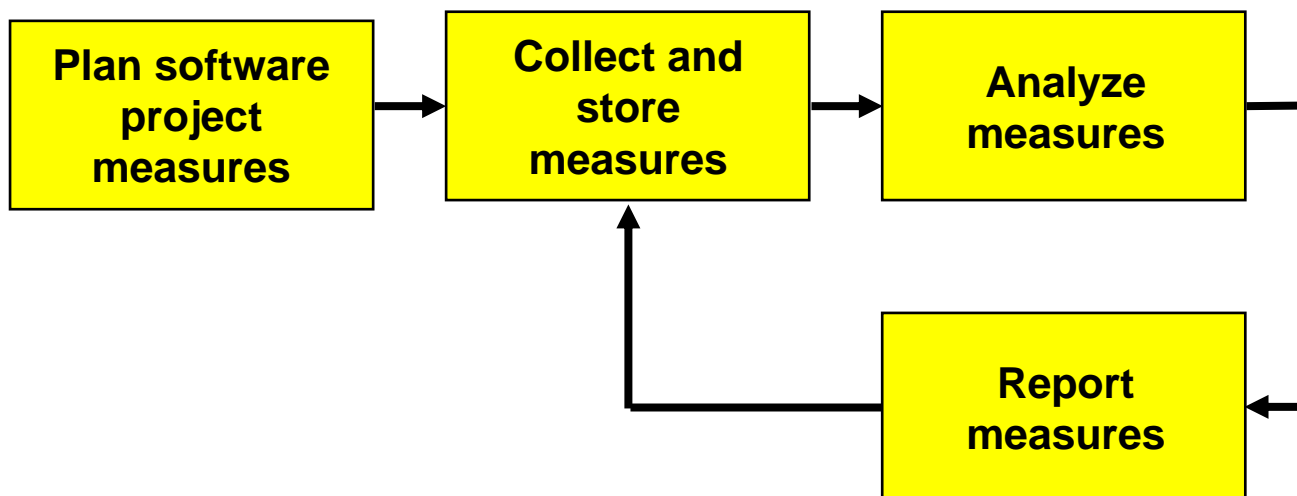
Measurement and Analysis Process

Helps you collect and analyze metric data to support both software project management and process improvement.



Measurement and Analysis Tasks

Tasks performed sequentially and iteratively



Measurement and Analysis – Related Assets

- **Policies**
 - ISD Software Policies (1.0.0.1)
- **Processes and Sub-processes**
 - ISD Measurement and Analysis (3.4)
 - ISD Measurement Plan (3.4.11)
- **Standards, Procedures, Guidelines, Templates, and Checklists**
 - ISD Branch Status Review Template (1.4.3.4)
 - ISD Software Management Plan/Product Plan for Class B & C Software, measurement section (1.2.6.1)
 - FSW Status Reporting Templates (1.4.3.2.1, 1.4.3.2.2, 1.4.3.2.3)
- **Tools**
 - Point Counting Spreadsheet (1.4.2.1)
 - ISD Measurement Collection Spreadsheet
- **Web Site**
 - (<http://software.gsfc.nasa.gov/metrics.htm>)

January 2006 – Using the website <http://software.gsfc.nasa.gov/>

Find tools

Locate training and experts

Use approved process assets

See Engineering process group (EPG) Contacts

Get measurement info

See lessons learned

The screenshot shows the main page of the GSFC Software Development Process Improvement website. The navigation bar includes links for: + GSFC SW IMPROVEMENT, + PROCESS ASSETS LIBRARY, + TRAINING, + TOOLS, + MEASURES, and + LESSONS LEARNED. The page also features a 'Welcome' message, 'News and Upcoming Events', and a 'General Information' section.

Use search function to find assets

Click asset name to get asset PDF

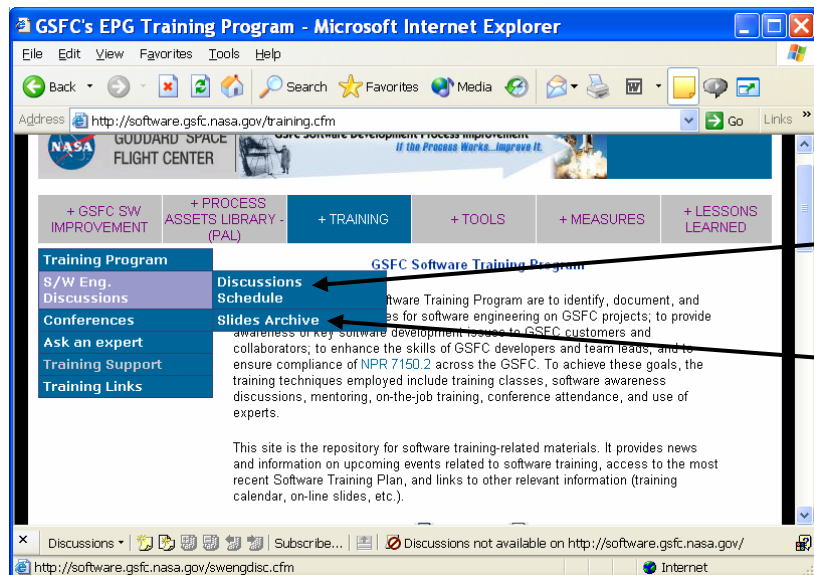
Click “?” to get feedback form

Click icons for desired files

The screenshot shows the 'Process Assets Approved' page. It features a search bar with the text 'List only assets with title containing: all' and a 'Find Assets' button. Below the search bar is a table of assets with columns: Asset Number, Document Number, Title, Owner, Asset Type, Status (More Info), MS Office, and PDF. The table lists several assets, including 'ISD Software Policies', 'ISD Project Planning Process', 'ISD Software Project Estimation', 'Wide band Delphi Procedure', and 'ISD In-house Life Cycle'.

Asset Number	Document Number	Title	Owner	Asset Type	Status (More Info)	MS Office	PDF
1.0.0.1	580-PL-002-01	ISD Software Policies	?	580	Policy	CCB approved	
1.2	580-PC-004-01	ISD Project Planning Process	?	580	Process	CCB approved	
1.2.1	580-SP-026-01	ISD Software Project Estimation	?	580	Guideline	CCB approved	
1.2.1.2	580-PR-016-01	Wide band Delphi Procedure	?	580	Procedure	CCB approved	
1.2.2.1.1		ISD In-house Life Cycle	?	582	Guideline	CCB approved	

January 2006– Accessing Presentation Slides From the Website



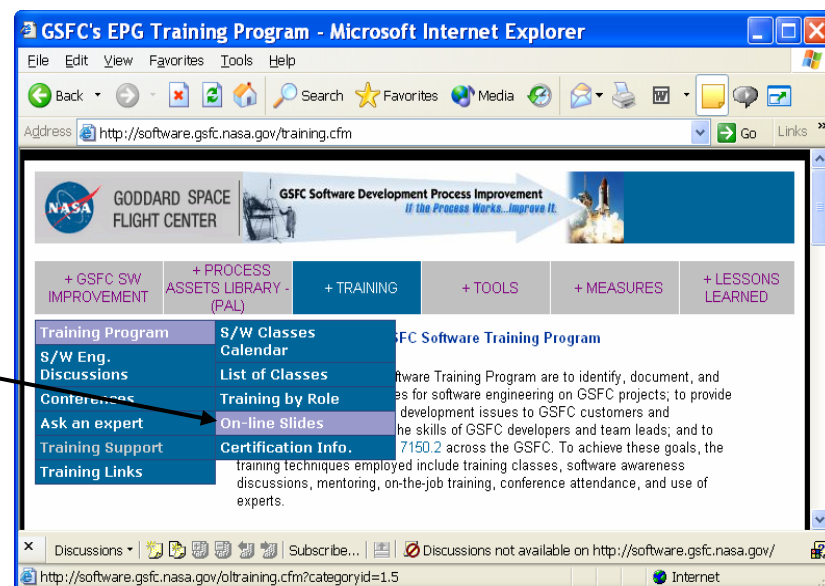
For SW Engineering Discussions ...
Click “Training” and highlight
“S/W Eng. Discussions”

Access SW Engineering Discussion schedule:
(<http://software.gsfc.nasa.gov/swengdisc.cfm>)

Access slides from past SW Engineering
Discussions:
(<http://software.gsfc.nasa.gov/swengdisc.cfm>)

For Other On-Line Slides...
Click “Training” and highlight
“Training Program”

Access slides from multiple
NASA centers



- **Get help when you need it**
 - **Sally Godfrey – Software Process Improvement Manager**
 - *Sara.H.Godfrey.1@gsfc.nasa.gov*
 - **Sanjeev Sharma – Software Process Improvement**
 - *Sanjeev.K.Sharma.1@gsfc.nasa.gov*

Questions